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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
QUASH, ANTHONY G	
ART UNIT	**PAPER NUMBER**
2881	

DATE MAILED: 10/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/265,183	TOMIOKA, MASAHARU	
	Examiner	Art Unit	
	Anthony Quash	2881	

-- The MAILING DATE of this communication app ars on the cover sheet with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-7 and 10-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-7 and 10-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3,5-7,10-12,14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stock [287], in view of G. J. Brakenhoff et al; "Femtosecond Pulse Width Control in Microscopy by Two-Photon Absorption Autocorrelation" and further in view of Denk [613]. As per claims 1,14, and 18-20, Stock [287] teaches a laser beam source for emitting a pulse laser beam for exciting a sample to cause a fluorescent light by multi-photon excitation phenomenon, a detector for detecting fluorescent light, an optical system for forming an optical path of said pulse laser beam for guiding said pulse laser beam. It also teaches a pre-chirp compensator arranged on said optical path for preventing a pulse width of said pulse laser beam from widening and a plurality of objective lenses capable of being selectively arranged on said optical path for collecting the pulse laser beam on the sample. See Stock [287] abstract, fig. 1, and columns 3,6 & 7. In addition, Stock [287] teaches the optical components of the pre-chirp compensator causing components of the pulse laser beam to be emitted in order of wavelength such that shorter wavelengths are emitted earlier than longer wavelengths. See Stock [287] col. 1 lines 45-67 and col. 2 lines 1-20. Although Stock

[287] does not explicitly teach the optical correcting element for adjusting the optical path length being adjustable by applying different voltages or different pressures, it does teach means provided for adjusting/correcting the optical path length. See Stock [287] column 3, col. 4 lines 1-20, col. 6 lines 60-67, and col. 7 lines 1-15 and 60-67. Therefore, it would have been an obvious matter of design choice to a person of ordinary skill in the art at the time the invention was made to have the optical correcting element for adjusting the optical path length be adjustable by applying different voltages or different pressures, since applicant has not disclosed that having the optical correcting element for adjusting the optical path length be adjustable by applying different voltages or different pressures solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with correcting means described by Stock [287]. In addition, Stock [287] teaches that a revolver/turret can be used for switching objective lenses. See Stock [287] col. 7 lines 60-67.

Stock [287] also does not teach providing a station for placing a sample to be observed. However, G. J. Brakenhoff does teach providing a station for placing a sample to be observed, and a correcting mechanism including optical correcting means for correcting an optical path length of said optical path to cause the pulse width of said pulse laser beam to be constant. See G. J. Brakenhoff p. 255 column 1, p. 257 column 2, and p. 258 column 1. Also see Stock [287] col. 7 lines 60-67. In addition, G. J. Brakenhoff teaches that the pre-chirp compensator can be adjusted. See G. J. Brakenhoff p. 258, col. 1 paragraph 3. Therefore it would have been obvious to one of

ordinary skill in the art at the time the invention was made to preset the pre-chirp compensator in order to reduce the broadening of the beam as taught in G. J. Brakenhoff. Denk [613] also teaches a laser-scanning microscope, a fluorophore having appropriate emission, a detector, and a station for placing the sample. See Denk [613] columns 9-10. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a station for placing a sample to be observed, and a correcting mechanism including optical correcting means for correcting an optical path length of said optical path to cause the pulse width of said pulse laser beam to be constant in order to provide interactive control of the pulse width at the focal point.

As per claims 2,15, Stock [287] teaches an interlocking mechanism for causing the correcting mechanism to be interlocked with said objective lenses. It also teaches microscope being comprised of a plurality of objective lenses. See Stock [287] column 3. Also see G. J. Brakenhoff p. 253 column 2. As to the applicant's claim that correcting mechanism was to be interlocked with switchover of the objective lens. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the correcting mechanism interlocked with switchover of the objective lens, since it has been held that the provision of adjustability, where needed, involves only routine skill in the art.

As per claim 3, Stock [287] teaches the optical correcting means arranged on said optical path in a position where said pulse laser beam forms a parallel luminous flux. Stock [287] also teaches optical correcting means including a plurality of optical

correcting elements capable of being arranged selectively on said optical path to cause the optical path length of said optical path to be constant in accordance with the respective optical path lengths of said objective lenses. See Stock [287] columns 3 & 4. Also see G. J. Brakenhoff p. 258 column 2.

As per claims 5,6,7, Stock [287] and G. J. Brakenhoff teach all aspects of the claims except for the correcting mechanism including a rotor and a slide supporting said optical correcting elements. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a rotor and a slide to support optical correcting elements since it was known in the art of microscopes to do so. Also see Ichic [342] fig. 2. It also would have been obvious to one of ordinary skill in the art at the time of the invention to have the correcting elements and said objective lenses be supported by the same supporting member and moved together in order to ensure that the proper distance between the correcting element and the objective lenses are maintained at all times which will then aid in the focusing of the device.

As per claim 10, Denk [613] teaches the optical system further comprising a scanning mechanism. See Denk [613] column 11.

As per claim 11, it would have been obvious to one of ordinary skill in the art at the time of the invention to position the optical correcting means between the scanning unit and the pre-chirp compensator in order correct the beam before it reaches the compensator.

As per claim 12, Denk [613] teaches the optical system including a portion for forming an optical path for guiding said fluorescent light to said detector. See Denk [613] column 5,10 and figs. 1,1A.

As per claim 16, G. J. Brakenhoff teaches an objective lens being arranged on the said optical path for collecting the pulse laser beam on the sample and an optical element inserted between said pre-chirp compensator and said objective lens. See G. J. Brakenhoff p. 254 fig. 2. However, it does not explicitly state that there should be a plurality of objective lenses capable of being selectively arranged on said optical path nor does it state that the optical element should be flat. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a plurality of objective lenses capable of being selectively arranged on said optical path in order to allow one to change the objective lens so without disturbing the rest of the apparatus in order to better focus the beam. It also would have been obvious to one of ordinary skill in the art at the time the invention was made to make the optical element flat since discovering the optimum shape would only involve routine skill in the art.

As per claim 17, Stock [287] teaches the optical element being a prism. See Stock [287] col. 11 lines 1-45. Also see Zavisian [010] col. 4 lines 30-55.

As per claim 21, Stock [287] teaches the plurality of optical correcting elements being adapted to be selectively placed on said optical path in accordance with which of the objective lenses is selectively placed on the optical path in a one-to-one corresponding relationship. See Stock [287] col. 60-67.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stock [287], G. J. Brakenhoff and Denk [613] as applied to claim 1 above, and further in view of White [289]. Stock [287], G. J. Brakenhoff and Denk [613] teach all aspects of the claimed invention except for the laser beam being detected that has already been transmitted through the sample. However, White [289] does teach a laser beam being detected after transmission of the beam. See White [289] abstract, fig. 1, and column 1. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to position a detector after the specimen in order to determine the amount of light that passes through the specimen as taught in White [289].

Response to Arguments

With respect to the applicants' argument that the prior art does not teach a pre-chirp compensator and a correcting mechanism for correcting the optical path length when the objective lens to be used is switched, it is the examiner's view that Stock [287] does teach this. Stock [287] teaches a pre-chirp compensator (20) and a correcting mechanism (40) for correcting the optical path when the objective lens to be used is switched. See Stock [287] fig. 1, col. 6 lines 33-40, 60-67. Specifically, Stock [287] teaches that one object of the present invention is to control the dispersion effects within an optical pulse source and/or a delivery optical fiber in order to compensate for the dispersion effects in an optical device, such as an optical measurement system. It also teaches that a correcting mechanism (40), a compressor, operates to compress the pulse width of the optical pulses, which have been transmitted through the single-mode

fiber (30). See Stock [287] col. 5 lines 1-10, col. 6 lines 60-67. Stock [287] goes on to teach that the optical device (50) has a known dispersion, (objective lens have known dispersions), providing the final compression of the high peak power pulse at a desired point within the optical device (50), such as the measurement point .... See Stock [287] col. 7 lines 10-15. Stock [287] then goes on to teach that, "The present invention can provide dispersion compensation for positive or negative dispersion effects. This allows for flexible optimization which can be calibrated to the optical path of the system so that a system user may provide the proper pre-compensation for an adjustable system, e.g., the microscope objectives in a turret in a two-photon laser scanning microscope." See Stock [287] col. 7 lines 1-15, and col. 60-67. Therefore because the compressor (40) compresses the optical pulse in cooperation with optical fiber, it will correct the dispersion for different objective lenses since it teaches that the dispersion that the system provides proper pre-compensation for objectives in a turret. See Stock [287] col. 6 lines 60-67.

With respect to the applicants' arguments Brakenhoff does not teach driving the correcting mechanism for correcting the optical path length in accordance with the type of objective lens used, without varying the chirp amount of the pre-chirp compensator, it is the examiner's view that Brakenhoff does teach this. Brakenhoff explicitly teaches an autocorrelation unit for correcting the pre-chirp amount with respect to an objective lens. See Brakenhoff p. 254 column 2, fig. 2, and p. 255 column 1.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 6,178,041 to Simon is considered pertinent because of its discussion on a device for coupling the radiation of short-pulse lasers in an optical beam path of a microscope.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (703)-308-6555. The examiner can normally be reached on M-F from 9 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee, can be reached on (703)-308-4116. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.

A. Quash 10/19/03

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